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Atamna

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(54) **SYSTEMS AND METHODS FOR SECURE FILE TRANSFERS**

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H04L 29/06 (2006.01)
H04L 29/08 (2006.01)

(52) **U.S. Cl.**
CPC ***H04L 63/0428*** (2013.01); ***H04L 63/02*** (2013.01); ***H04L 67/06*** (2013.01)

(58) **Field of Classification Search**
CPC H04L 29/06
USPC 713/168
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,430,759 B2 9/2008 Piepiorra et al.
7,565,526 B1 * 7/2009 Shaw H04L 63/029 713/150
8,595,831 B2 11/2013 Skare
8,683,053 B2 * 3/2014 Asveren H04L 63/029 709/228
2003/0126468 A1 * 7/2003 Markham H04L 63/0218 726/13
2004/0205332 A1 * 10/2004 Bouchard H04L 63/0485 713/153
2005/0027818 A1 * 2/2005 Friedman H04L 29/06 709/217
2008/0109889 A1 5/2008 Bartels
2009/0064304 A1 * 3/2009 Cohen H04L 63/029 726/11
2009/0222885 A1 * 9/2009 Batke H04L 63/061 726/1
2011/0314272 A1 12/2011 Nagel et al.
2013/0018939 A1 1/2013 Chawla et al.
2014/0337410 A1 * 11/2014 Mraz H04L 67/06 709/203

FOREIGN PATENT DOCUMENTS

CN 201188626 Y 1/2009
WO 2007044832 A2 4/2007
WO 2013012654 A2 1/2013

OTHER PUBLICATIONS

Dirk; Bridging the Science; year:2006; E&S; p. 1-20.*
EP Search Report issued Mar. 11, 2015 in connection with corersponding EP Application 14191891.2.
Non-Final Office Action dated Jan. 14, 2015 for U.S. Appl. No. 14/072,414.
Response to Non-Final Office Action filed Apr. 15, 2015 for U.S. Appl. No. 14/072,414.
EP Search Report issued on Mar. 11, 2015 in relation to corresponding EP application 14191515.7.

* cited by examiner

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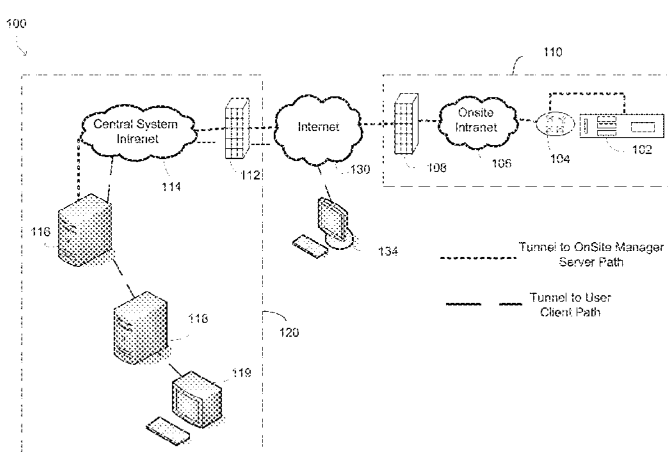
(57) **ABSTRACT**

Embodiments of the disclosure can include systems and methods for secure file transfers. The onsite monitoring system secure file transfer solution can allow for transferring operational data by an onsite system behind a firewall to a central monitoring and diagnostic infrastructure by sending asynchronous, concurrent, parallel files over a port using a previously opened connection.

19 Claims, 7 Drawing Sheets



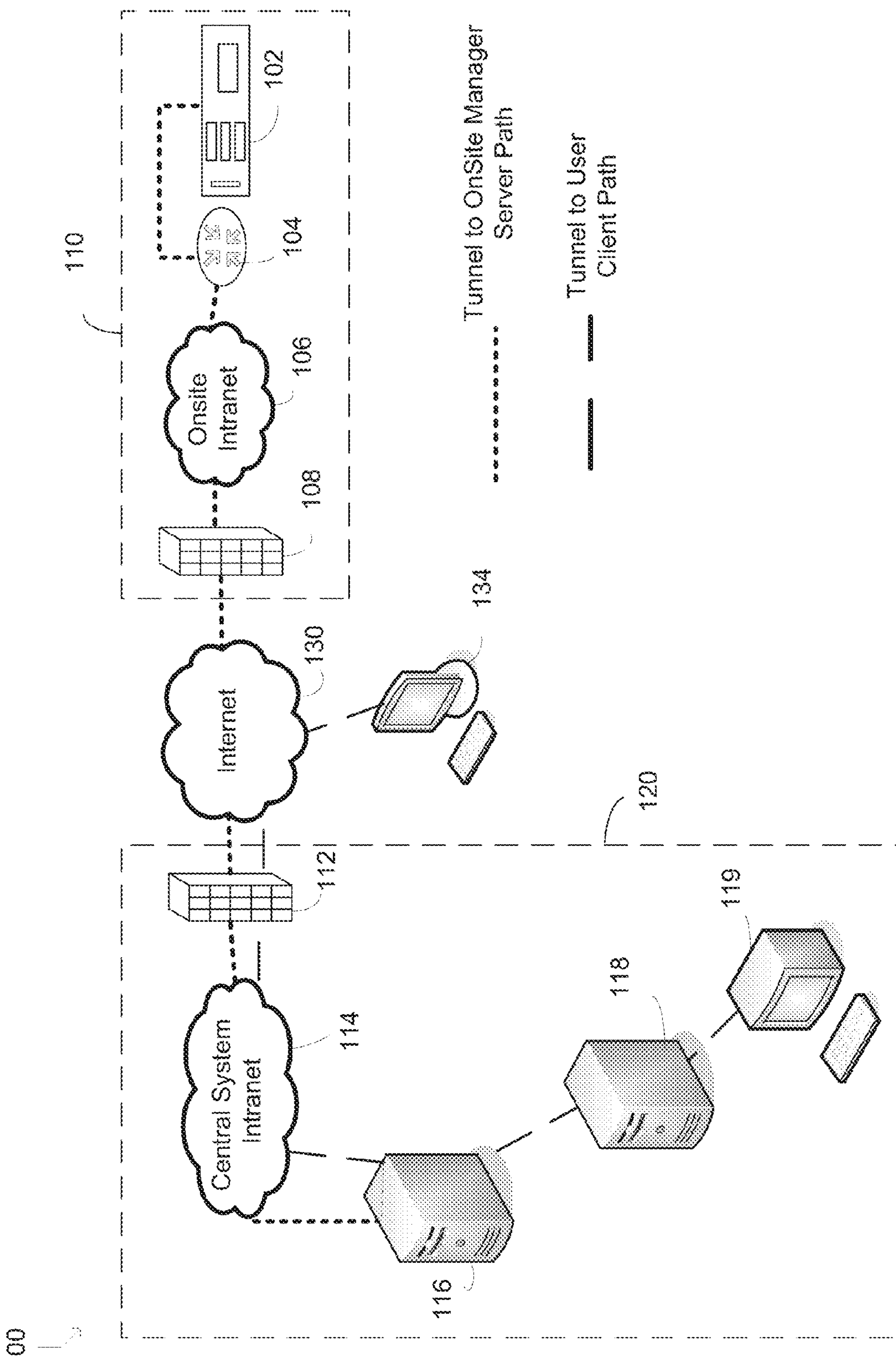

100
110
102
104
Onsite Intranet
106
108
Tunnel to OnSite Manager Server Path
Tunnel to User Client Path
130
Internet
134
120
112
Central System Intranet
114
116
118
119

FIG. 1

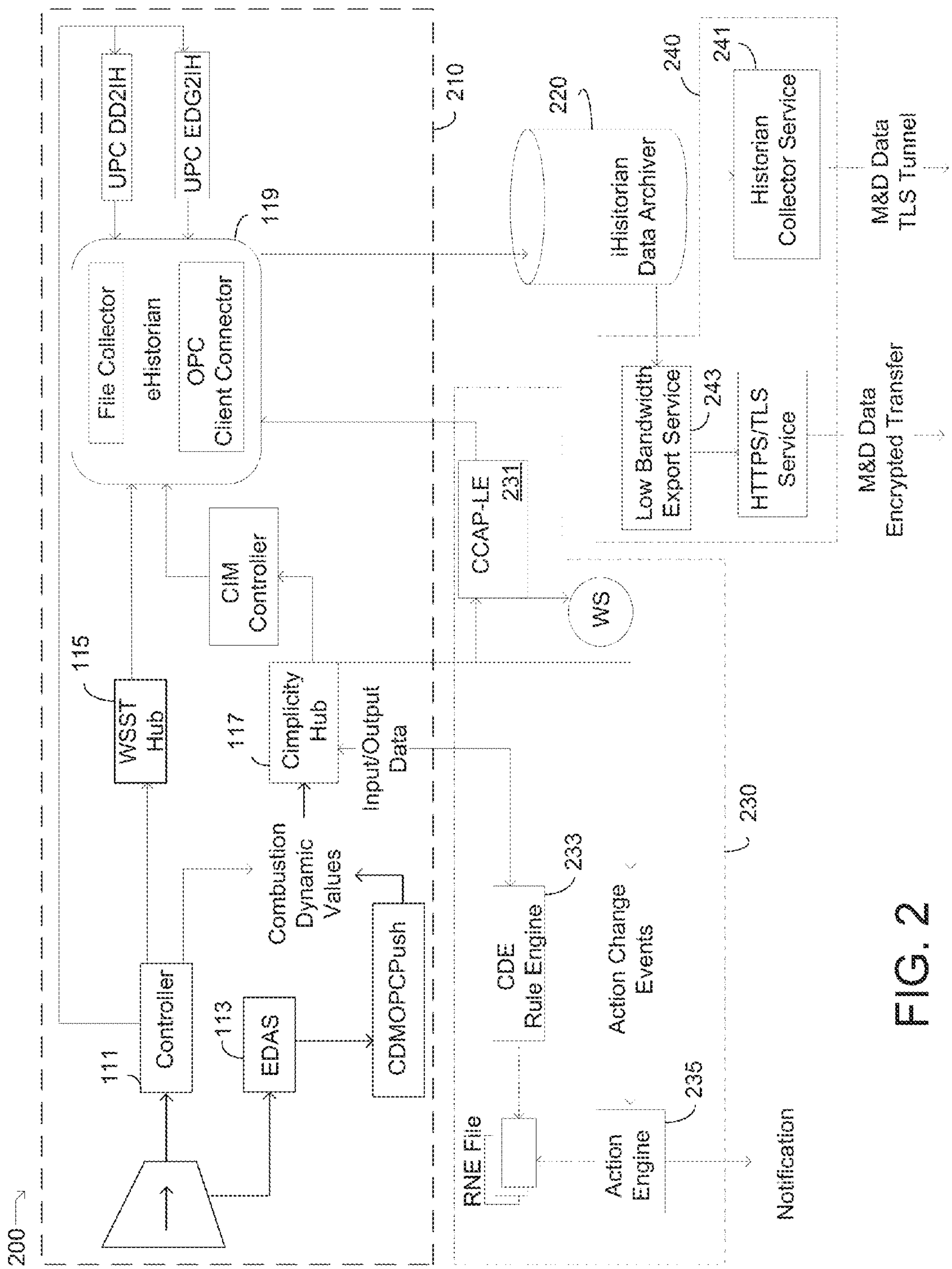

200
210
Controller
111
EDAS
113
CDMOPCPush
Combustion Dynamic Values
WSST Hub
115
Cimplicity Hub
117
Input/Output Data
CIM Controller
File Collector
eHistorian
OPC Client Connector
119
UPC DD2IH
UPC EDG2IH
iHistorian Data Archiver
220
240
241
Historian Collector Service
M&D Data TLS Tunnel
Low Bandwidth Export Service
243
HTTPS/TLS Service
M&D Data Encrypted Transfer
CCAP-LE
231
WS
230
CDE Rule Engine
233
Action Change Events
RNE File
Action Engine
235
Notification

FIG. 2

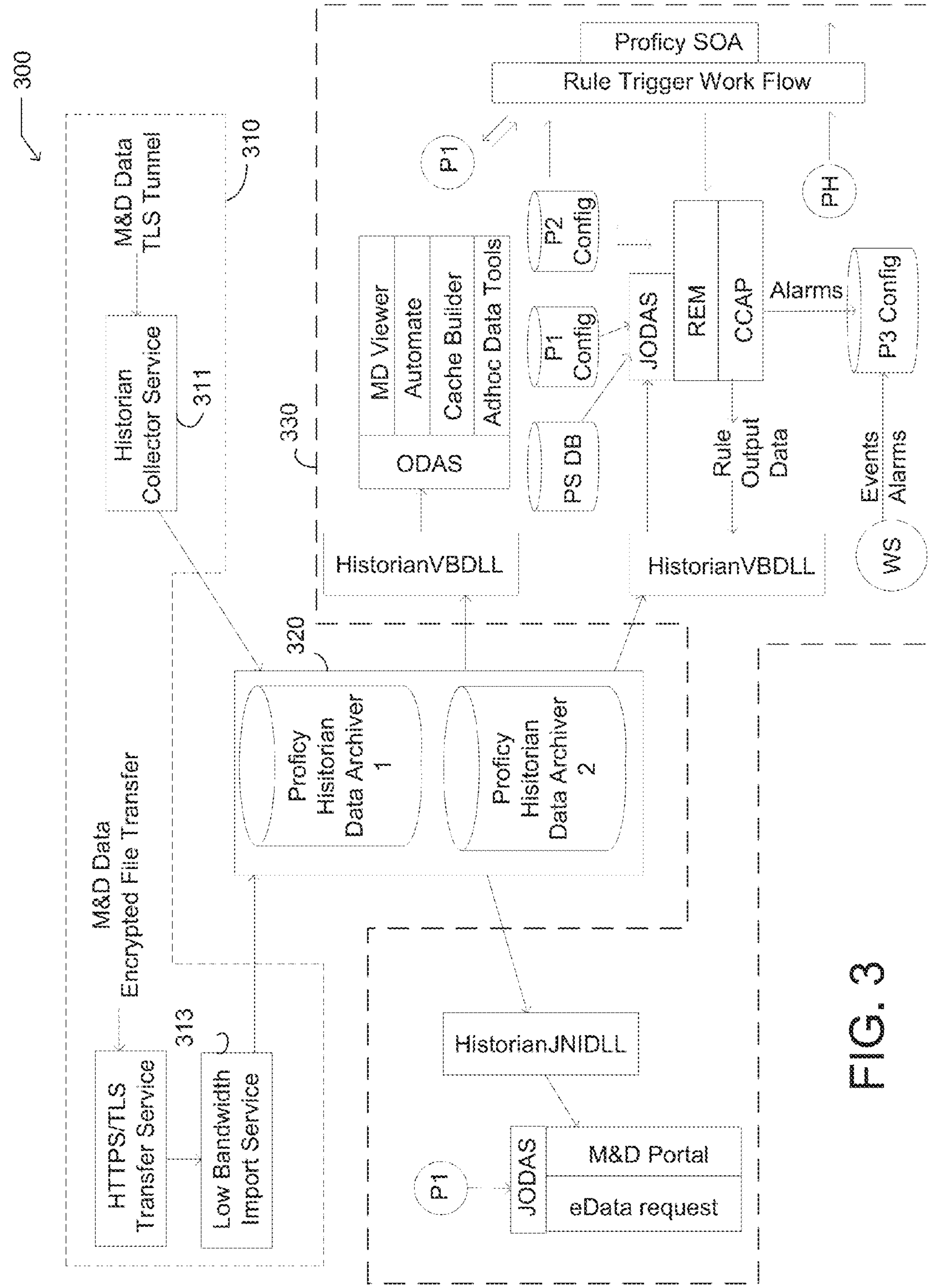

300
310
M&D Data TLS Tunnel
Historian Collector Service
311
M&D Data Encrypted File Transfer
HTTPS/TLS Transfer Service
Low Bandwidth Import Service
313
320
Proficy Hisitorian Data Archiver 1
Proficy Hisitorian Data Archiver 2
330
HistorianVBDLL
HistorianVBDLL
ODAS
MD Viewer
Automate
Cache Builder
Adhoc Data Tools
PS DB
P1 Config
P2 Config
JODAS
REM
CCAP
Alarms
P3 Config
Rule Output Data
Events Alarms
WS
PH
P1
Rule Trigger Work Flow
Proficy SOA
HistorianJNIDLL
P1
JODAS
M&D Portal
eData request

FIG. 3

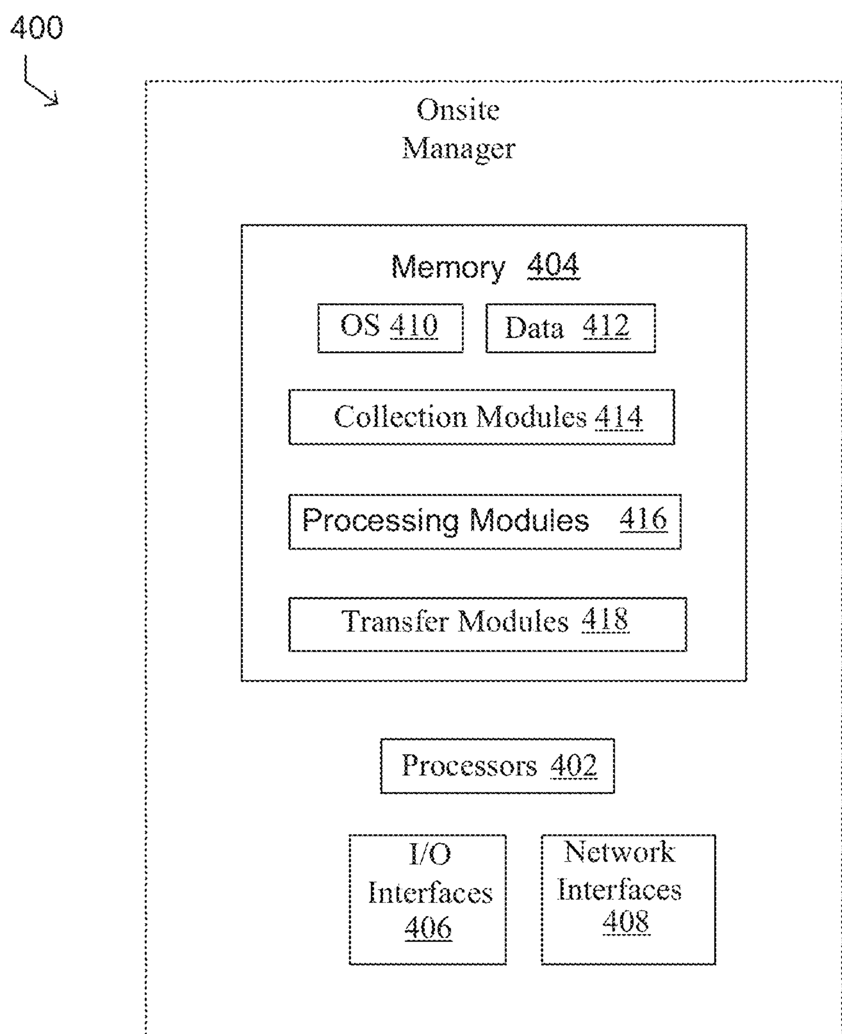

400
Onsite Manager
Memory 404
OS 410
Data 412
Collection Modules 414
Processing Modules 416
Transfer Modules 418
Processors 402
I/O Interfaces 406
Network Interfaces 408

FIG. 4

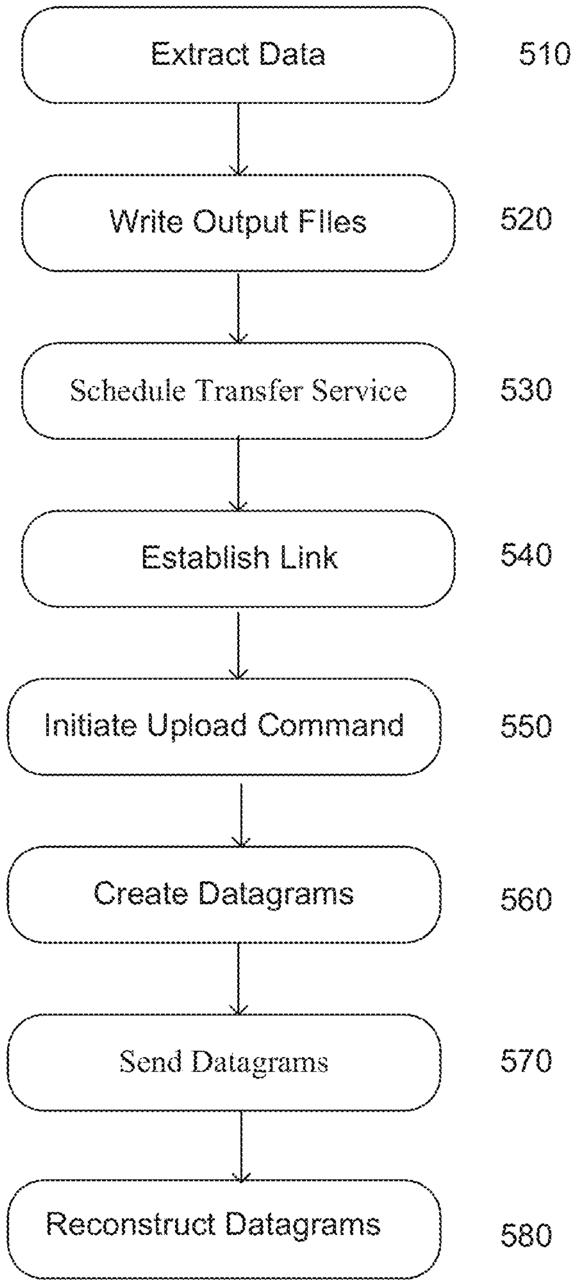

Extract Data
510
Write Output Files
520
Schedule Transfer Service
530
Establish Link
540
Initiate Upload Command
550
Create Datagrams
560
Send Datagrams
570
Reconstruct Datagrams
580

FIG. 5

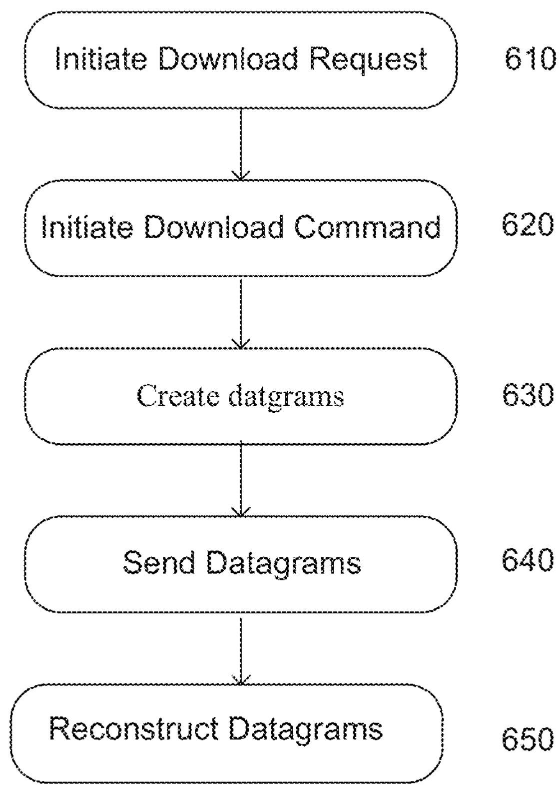
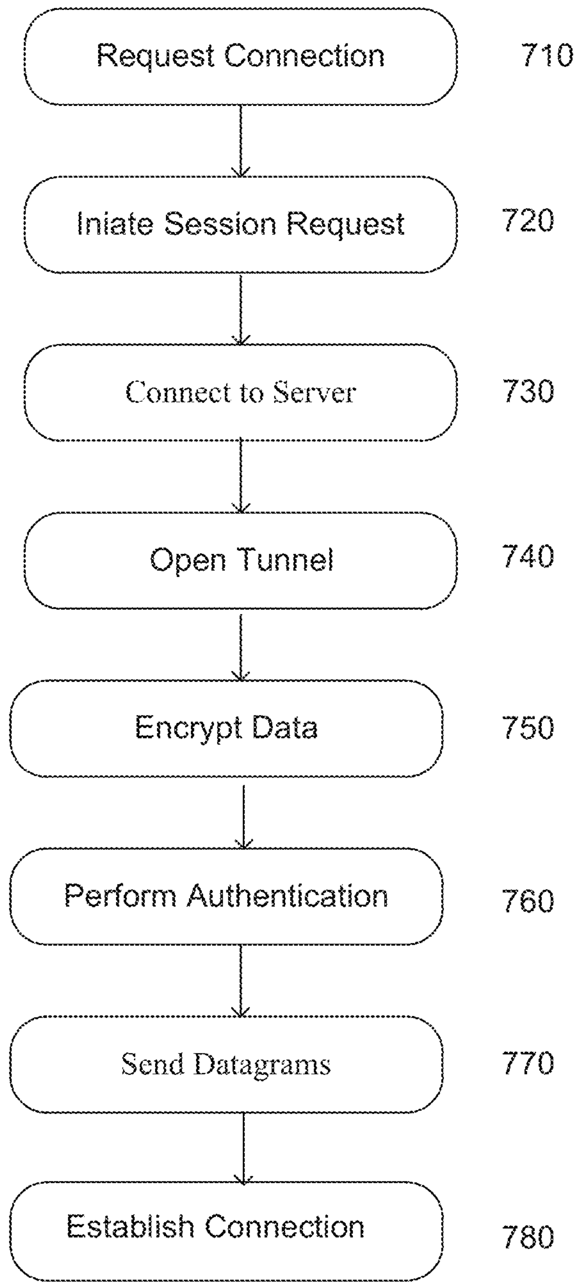

Initiate Download Request
610
Initiate Download Command
620
Create datgrams
630
Send Datagrams
640
Reconstruct Datagrams
650

FIG. 6



Request Connection
710
Iniate Session Request
720
Connect to Server
730
Open Tunnel
740
Encrypt Data
750
Perform Authentication
760
Send Datagrams
770
Establish Connection
780

FIG. 7

SYSTEMS AND METHODS FOR SECURE FILE TRANSFERS

TECHNICAL FIELD

This disclosure generally relates to communication security, and in particular to systems and methods for secure file transfers.

BACKGROUND

Monitoring and diagnostic (M&D) centers can provide numerous services for power plant units as well as other assets. Such services may include asset monitoring, event tracking, trip event reporting, root cause classification, forced outage detection, diagnostics and reporting with various recommendations to a site. Raw operational data as well as post-processed data can be derived from analytics which may be used by various engineering teams for performance and reliability studies, warranty support, and engineering research and development.

However, new requirements are being imposed for the large set of existing power plants requiring relatively secure file transfers. Many sites need to comply with North American Electric Reliability Corporation (NERC) or other regulatory security requirements and other communication security challenges. In addition, many of these sites have limited bandwidth connections and relatively unstable or otherwise unreliable links.

Typically, the onsite monitoring is located within the power plant infrastructure. The onsite network is usually protected by firewalls and a proxy at the plant edge that may prevent inbound connections and thus enforcing that the onsite monitoring is non-routable. Furthermore, all standard bi-directional TCP/HTTP communication ports are usually blocked by the firewall to ensure the security of the system.

Current communications typically require a bi-directional based communication ports schema, and current data transport technologies are generally not able to adequately deal with dial-up or low bandwidth network topologies (e.g., significant latency, bandwidth management under stress conditions). Furthermore, a uni-directional general purpose file transfer solution is not available.

In order to meet new and ever growing customer security requirements, relatively secure file transfer solutions are needed to provide secure data transfer for transport of data between an onsite monitoring system and a central monitoring and diagnostic infrastructure. A secure file transfer package is needed to be deployed to support onsite monitoring sites with limited bandwidth connections and relatively unstable or otherwise unreliable links so that they can comply with NERC or other regulatory requirements and meet other communication security challenges.

BRIEF DESCRIPTION OF THE DISCLOSURE

Some or all of the above needs may be addressed by certain embodiments of the disclosure. According to an example embodiment, there is disclosed a method for transferring data that may include collecting operational data by an onsite system behind a firewall, writing output files in a transfer directory, scheduling an asynchronous intelligent transfer service, establishing a secure certificate based uni-directional encrypted link between the onsite system and a central system, initiating a command upload message for asynchronous, concurrent parallel file upload, creating associated outbound datagrams, sending the outbound datagrams over a predetermined specific port, and reconstructing the outbound datagrams by the central system.

The method may further include sending to an open outbound uni-directional port, by the central system, a file download request message within a reply to a previous message from the onsite system, initiating, by the onsite system, a download command message for asynchronous concurrent parallel files download, creating, by the central system, associated secure datagrams, sending the inbound datagrams serially over the port using a previously opened connection, and reconstructing the inbound datagrams by the onsite system.

In another embodiment, a system for transferring data is disclosed. The system may comprise an onsite system behind a firewall. The onsite system may be operable to collect operational data, write files in a transfer directory, schedule an asynchronous intelligent transfer service, establish a secure certificate based uni-directional encrypted link between the onsite system and a central system, initiate a command upload message for asynchronous, concurrent parallel file upload, create associated outbound datagrams, and send the outbound datagrams over a predetermined specific port. The central system may be operable to reconstruct the outbound datagrams based at least in part on received outbound datagrams and send a file download request message within a reply to a previous message from the onsite system to an open outbound uni-directional port.

Other embodiments, features, and aspects of the disclosure are described in detail herein and are considered a part of the claimed disclosure. Other embodiments, features, and aspects can be understood with reference to the following detailed description, accompanying drawings, and claims.

BRIEF DESCRIPTION OF THE FIGURES

References will now be made to the accompanying figures, which are not necessarily drawn to scale, and wherein:

FIG. **1** is a schematic block diagram of an example system architecture for providing secure data transfer for transport of data between an onsite monitoring system and a central monitoring and diagnostic infrastructure in accordance with an embodiment of the disclosure.

FIG. **2** illustrates a schematic block diagram of an example onsite monitoring system in accordance with an embodiment of the disclosure.

FIG. **3** illustrates a schematic block diagram of an example central monitoring and diagnostic infrastructure in accordance with an embodiment of the disclosure.

FIG. **4** illustrates a functional block diagram of an example onsite monitoring system in accordance with an embodiment of the disclosure.

FIG. **5** is a flowchart illustrating an exemplary secure file upload of data between an onsite monitoring system and a central monitoring and diagnostic infrastructure in accordance with an embodiment of the disclosure.

FIG. **6** is a flowchart illustrating an exemplary secure file download of data between an onsite monitoring system and a central monitoring and diagnostic infrastructure in accordance with an embodiment of the disclosure.

FIG. **7** is a flowchart illustrating an exemplary secure remote access to an onsite monitoring system in accordance with an embodiment of the disclosure.

DETAILED DESCRIPTION

Example embodiments of the disclosure now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments are shown. Indeed, the disclosure may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

To achieve secure file transfers supporting onsite monitoring of power plants with limited bandwidth connections or relatively unstable or otherwise unreliable links, a new infrastructure combining various hardware, software, and networking technologies has been developed. Certain embodiments of the disclosure may have the technical effect of enabling asynchronous, service oriented, extraction of data from a repository on the onsite monitoring system and transferring data to a central storage repository for analytics processing. Another technical effect of certain embodiments of the disclosure may allow asynchronous, parallel, simultaneous downloading and uploading of files between designated servers in the central monitoring and diagnostic infrastructure and the onsite monitoring system while providing security, dynamic guarantee of service, and reliability features.

Referring to FIG. **1** of the drawings, there is shown a schematic block diagram of an example system architecture **100** for providing secure data transfer for transport of data between an onsite monitoring system **110** and a central monitoring and diagnostic infrastructure.

The onsite monitoring system **110** may be implemented by using a Windows™ based platform **102** (typically a high computing server), with various networking capabilities and may be collocated at the power plant site behind a corporate firewall **108**. The onsite network **106** may be protected by firewalls **108** and a proxy **104** at the plant edge preventing inbound connections and thus enforcing that the onsite monitoring is non-routable. Furthermore, all standard bi-directional TCP/HTTP communication ports may be blocked by the firewall **108**.

The onsite monitoring secure remote access solution may provide monitoring and diagnostic users **119**, **134** with the ability to securely and remotely access the onsite monitoring system **110** and perform certain administration or management tasks. Communication security may be provided by integrating the HTTPS/TLS protocols stack with a customized software package referred to as an intelligent agent.

A user **119** utilizing the central system Intranet **114** or a remote user **134** connected to the outside Internet **130** may establish a connection to a remote enterprise server **118**. The remote enterprise server **118** may establish a connection with an enterprise tunneling server **116**. The user **119**, **134** may then establish a user initiated remote desktop protocol (RDP) session to the onsite monitoring system **110**. Communication security may be provided using a TLS/SSL based tunneling methodology encapsulating the remote access session data.

An M&D user **119** or a remote user **134** may request an RDP connection to the onsite monitoring system **110**. Since the traffic port is uni-directional (open outbound only), the agent server **116** may initiate an RDP session request message within a reply to any previous message from an intelligent agent **102** residing on a server within the onsite monitoring system **110**. The intelligent agent **102** then may connect to a RDP module within the onsite monitoring system **110**.

Referring to FIG. **2**, illustrated is an example of onsite monitoring (OSM) **200** in accordance with an embodiment of the disclosure. The OSM **200** may be implemented on a Windows™ based platform (typically a high performance server), with various networking capabilities and is collocated at the power plant site behind the corporate firewalls.

Data collection software modules **210** may be associated with the collection of the units' operational and dynamic data, such as temperature, pressure, flow rate, clearance (e.g., distance between two components) and vibration data of turbomachinery. Various types of controllers, based on network connectivity capabilities and raw data resolution, are used to interface with the unit sensors. The controller may range from the proprietary controllers **111** to standard Ethernet Data Acquisition Systems (EDAS) **113**. The collected raw data may then be processed and transferred to other OSM modules via data hubs. The data hubs may collect tremendous volumes of real-time production information and perform supervisory automation along with delivery of reliable information to higher-level analytic applications. Such data hubs may include certain proprietary hubs such as WSST **115**, cimplicity **117** and the eHistorian **119** collector modules. In addition, these modules can provide a combined source for data quality and time coherency.

The storage software modules **220** may be associated with data storage and archiving. The software platform can be a proprietary platform such as PROFICY HISTORIAN, and can provide the ability for local storage of time series data as well as processed data generated by the analytics outputs. It can also provide the ability to manage data quality using various compression and interpolation techniques.

The data processing modules **230** may be associated with data processing as well as events and alarms escalation. Analytics based data processing may be provided by a proprietary platform, such as CENTRAL CONDITION ASSESSMENT PLATFORM—LOCAL EDITION (CCAP-LE) **231** and continuous diagnostic engine (CDE) rule engine platforms **233**. Alarms and event escalation may be performed by an action engine **235** and may send notifications via email or web based services.

The transfer modules **240** may be associated with data transfer to the central monitoring and diagnostic system. Two types of transport mechanisms are generally available based on site specific security requirements, network topology, and available bandwidth. The first mechanism may leverage a historian collector to collector service **241** to provide real time data streaming transport. The second mechanism combines the services provided by a low bandwidth and intelligent agent modules **243** for secure (one way traffic/push), asynchronous, concurrent, and reliable files transport.

Accordingly, at least one technical effect may enable low bandwidth and intelligent agent modules to provide secure (one way traffic), asynchronous, concurrent, and reliable files transport.

FIG. **3** illustrates an example central monitoring and diagnostic infrastructure **300** in accordance with an embodiment of the disclosure.

The central system transfer modules **310** may be associated with data transfer from the onsite system. Two types of transport mechanisms are generally available. The first mechanism may leverage a historian collector to collector service **311** to provide real time data streaming transport. The second mechanism may provide relatively low bandwidth import services **313** for a relatively secure (one way traffic/push), asynchronous, concurrent, and reliable file transport.

The central storage software modules **320** may be associated with the data storage and archiving of the time series data initially collected and transferred from the OSM's fleet. This software platform may provide the ability for storage of time series data as well as processed data generated by the analytics outputs. The central storage software module **320** may provide enterprise-wide data historian services that archive and distribute tremendous volumes of real-time production information at extremely high speeds. It may also provide the ability to manage data quality using various compression and interpolation techniques.

The central storage software modules **320**, such as PROFICY HISTORIAN, may be operable to compare years of historical data to real-time data to allow for a myriad of analysis possibilities. This solution may provide the tools to compare assets across a fleet and over long periods of time to better understand how equipment and processes are running versus how they should be running.

The remaining set of illustrated modules **330** are a collection of configuration databases, monitoring and diagnostic operation visualization tools, and analytics rule engines as well as the analytics runtime environment and associated application programming interfaces and service oriented architectures.

Referring to FIG. **4**, illustrated is a functional block diagram of an example onsite manager **400** in accordance with an embodiment of the disclosure. The onsite manager **400** may include one or more processors **402**, one or more memories **404**, one or more input/output (I/O) interfaces **406**, and one or more network interfaces **408**. The onsite manager **400** may include other devices not depicted.

The one or more processors **402** may include one or more cores and are configured to access and execute at least in part instructions stored in the one or more memories **404**. The one or more memories **404** can include one or more computer-readable storage media (CRSM). The one or more memories **404** may include, but are not limited to, random access memory (RAM), flash RAM, magnetic media, optical media, and so forth. The one or more memories **404** may be volatile in that information is retained while providing power or non-volatile in that information is retained without providing power.

The one or more I/O interfaces **406** may also be provided in the online manager **400**. These I/O interfaces **406** can allow for coupling devices such as sensors, keyboards, mice, monitors, printers, external memories, and the like. The one or more I/O interfaces **406** may allow for coupling to various sensors and controllers that can provide operational data across the system.

The one or more network interfaces **408** may provide for the transfer of data between the online manager **400** and another device directly such as in a peer-to-peer fashion, via a network, or both. The one or more network interfaces **408** may include, but are not limited to, personal area networks (PANs), wired local area networks (LANs), wide area networks (WANs), wireless local area networks (WLANs), wireless wide area networks ("WWANs"), and so forth. The one or more network interfaces **408** may utilize acoustic, radio frequency, optical, or other signals to exchange data between the online manager **400** and other devices,

The one or more memories **404** may store instructions or modules for execution by the one or more processors **402** to perform certain actions or functions. The following modules are included by way of illustration, and not as a limitation. Furthermore, while the modules are depicted as stored in the memory **404**, in some implementations, these modules may be stored at least in part in external memory which is accessible to the online manager **400** via the network interfaces **408** or the I/O interfaces **406**. These modules may include an operating system module **410** configured to manage hardware resources such as the I/O interfaces **406** and provide various services to applications or modules executing on the processor **402**.

The collection modules **414** may be stored in the memory **404**. The collection modules **414** may be configured to continuously acquire data from the one or more input devices and calculate various parameters. The collection modules **414** may be associated with the collection of the units' operational and dynamic data such as temperature, pressure, flow rate, clearance (e.g., distance between two components) and vibration data of turbo-machinery. Various types of controllers (based on network connectivity capabilities/raw data resolution) are used to interface with the units' sensors. The controllers can range from certain proprietary controllers, such as MARK controllers, to a standard Ethernet Data Acquisition System (EDAS). The collected raw data is then processed and transferred to other OSM modules via various data hubs. In addition, these modules may provide a combined source for data quality and time coherency. The collection module **414** may store the data and calculated estimates in the datastore **412**.

The processing modules **416** may be configured to store and archive data. The software platform may provide the ability for local storage of time series data as well as processed data generated by the analytics outputs. It also may provide the ability to manage data quality using various compression and interpolation techniques.

The transfer modules **418** may be configured to transfer data to the central M&D system. A first mechanism may be configured for a collector to collector service that provides real time data streaming transport. A second mechanism may combine the services provided by a low bandwidth intelligent agent module for a secure (one way traffic/push), asynchronous, concurrent, and reliable files transport.

The online manager **400** described above with reference to FIG. **4** is provided by way of example only. As desired, numerous other embodiments, systems, methods, apparatus, and components may be utilized to control the gas turbine firing temperature below the critical temperature.

FIG. **5** is a flowchart **500** illustrating an exemplary secure file upload of data between an onsite monitoring system and a central monitoring and diagnostic infrastructure in accordance with an embodiment of the disclosure.

In block **510**, the low bandwidth export service may extract data from an archiver module. Block **510** is followed by block **520**, in which the output files may be written to upload/download directories. In block **530**, an asynchronous background intelligent transfer service may be scheduled.

In block **540**, the intelligent agent may establish a secure (certificates based) uni-directional (using networking port **243**) TLS/SSL encrypted link between the OSM and the associated central file transfer servers.

In block **550**, the intelligent agent may initiate a command upload message for asynchronous, concurrent, parallel files upload. Block **560** follows block **550**, in which the intelligent agent may create associated HTTPS chunks and may send the datagrams serially over a preselected port (port **443** in this example) in block **570**. The data transport reliability is performed via checksum (for each chunk and on the complete file) as well as by the retransmit and fault tolerance mechanisms provided by the underlying transport protocol stack. Block **580** follows block **570**, in which the HTTPS datagrams may be reconstructed by the agent server service and presented to the low bandwidth import service.

FIG. **6** is a flowchart **600** illustrating an exemplary secure file download of data between an onsite monitoring system and a central monitoring and diagnostic infrastructure in accordance with an embodiment of the disclosure.

In block **610**, the agent server initiates a file download request message within a reply to any previous message from the intelligent agent since the pre-selected traffic port (port **243**) may be uni-directional (open outbound only). Block **610** is followed by block **620** in which the intelligent agent may initiate a download command message for asynchronous, concurrent, parallel files download. In block **630**, the agent server creates the associated HTTPS chunks and sends, in block **640**, the datagrams serially over a port (port **243**) using the connection previously opened by the intelligent agent. The data transport reliability is performed by the agent server via checksum (for each chunk and on the complete file) as well as by the retransmit and fault tolerance mechanisms provided by the underlying transport protocol stack. Finally, in block **650**, the HTTPS datagrams are reconstructed by the intelligent agent service and presented to the low bandwidth export service.

FIG. **7** is a flowchart **700** illustrating an exemplary secure remote access to an onsite monitoring system. Communication security is provided using a TLS/SSL based tunneling methodology encapsulating the remote access session data.

In block **710**, a user may request a remote desktop protocol (RDP) connection to the onsite monitoring system. In block **720**, the agent server may initiate a RDP session request message within a reply to any previous message from the intelligent agent since the traffic port **443** is uni-directional (open outbound only).

In block **730**, the intelligent agent connects to the RDP server on the onsite monitoring system. Block **740** follows block **730**, in which the intelligent agent opens a TLS/SSL tunnel at the agent server. In block **750**, the data is encrypted using a validated crypto library, and in block **760**, the intelligent agent completes the authentication process. Finally in block **780**, the connection may be established. The end to end RDP connection may be established by connecting the intermediate connections between the onsite monitoring system RDP server, the intelligent agent, the agent server, and the end user computing device.

The operations and processes described and shown above may be carried out or performed in any suitable order as desired in various implementations. Additionally, in certain implementations, at least a portion of the operations may be carried out in parallel. Furthermore, in certain implementations, less than or more than the operations described may be performed.

This written description uses examples to disclose certain embodiments of the disclosure, including the best modes, and also to enable any person skilled in the art to practice certain embodiments of the disclosure, including making and using any devices or systems and performing any incorporated methods. The patentable scope of certain embodiments of the disclosure is defined in the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they have structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal language of the claims.

I claim:

1. A method for transferring data, comprising:

writing, by one or more onsite processors associated with an onsite system behind a firewall that prevents inbound connections, output files in a transfer directory;

scheduling, by the one or more onsite processors, an asynchronous intelligent transfer service;

establishing, by the one or more onsite processors, a secure certificate based uni-directional encrypted link between the onsite system and a central system;

sending, by the one or more onsite processors, a message to the central system;

sending, by one or more central processors associated with the central system, to an open outbound uni-directional port associated with a previous message from the onsite system a file download request message within a reply to the previous message from the onsite system, wherein the port prevents non-outbound communications and blocks non-reply messages;

initiating, by the one or more onsite processors, a download command message for asynchronous concurrent parallel files download;

sending, by the one or more onsite processors, at least one of the files over the port using a previously opened connection.

2. The method of claim **1**, further comprising:

sending outbound datagrams serially over the port using a previously opened connection and reconstructing inbound datagrams by the onsite system.

3. The method of claim **1**, further comprising performing data transport reliability on the outbound datagrams via checksum by the central system on each outbound datagram and at least one complete file.

4. The method of claim **2**, further comprising performing data transport reliability on the inbound datagrams via checksum by the onsite system on each inbound datagram and at least one complete file.

5. The method of claim **1**, wherein sending the outbound datagrams comprises sending the outbound datagrams via a low bandwidth service.

6. The method of claim **1**, wherein collecting operational data comprises collecting the operational data from a plurality of onsite controllers in communication with a plurality of sensors.

7. The method of claim **1**, wherein the firewall prevents standard bi-directional transport control protocol communications.

8. The method of claim **1**, further comprising managing the data using interpolation and/or compression techniques.

9. The method of claim **1**, further comprising ensuring quality and time coherency of the operational data.

10. The method of claim **1**, further comprising performing analytics and diagnostics on the operational data.

11. A system for transferring data, comprising:

an onsite system behind a firewall, one or more onsite processors associated with the onsite system operable to:

collect operational data;

write files in a transfer directory;

schedule an asynchronous intelligent transfer service;

establish a secure certificate based uni-directional encrypted link between the onsite system and a central system;

initiate a command upload message for asynchronous, concurrent parallel file upload;

create associated outbound datagrams; and

send the outbound datagrams over a predetermined specific port, wherein the predetermined specific port prevents non-outbound communications and blocks non-reply messages; and

one or more onsite processors associated with the central system operable to:

based at least in part on received outbound datagrams, reconstruct the outbound datagrams;

send, to an open outbound uni-directional port, a file download request message within a reply to a previous message from the onsite system;

the one or more onsite processors associated with the onsite system is further operable to:

initiate a download command message for asynchronous concurrent parallel files download;

create additional outbound datagrams;

send the additional outbound datagrams serially over the outbound uni-directional port using a previously opened connection.

12. The system of claim **11**, wherein the central system is further operable to:

perform data transport reliability on the outbound datagrams via checksum on each outbound datagram and a complete file.

13. The system of claim **11**, wherein the onsite system is further operable to: perform data transport reliability on the inbound datagrams via checksum on each inbound datagram and a complete file.

14. The system of claim **11**, wherein the onsite system is further operable to: send the outbound datagrams via a low bandwidth service.

15. The system of claim **11**, wherein the onsite system is further operable to:

collect the operational data from a plurality of onsite controllers in communication with a plurality of sensors.

16. The system of claim **11**, wherein the firewall is operable to prevent standard bi-directional transport control protocol communications.

17. The system of claim **11**, wherein the onsite system is further operable to: manage the data by using interpolation and/or compression techniques.

18. The system of claim **11**, wherein the onsite system is further operable to: ensure quality and time coherency of the operational data.

19. The system of claim **11**, wherein the central system is operable to: perform analytics and diagnostics on the operational data.

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